The Application of Education Research to Music Therapy Using Interactive Sequential Patterns Analysis

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Abstract

The object of this study is to indicate the application of "interactive sequential patterns analysis" which was originally developed for the study of education for people with special needs, and to translate it for individual music therapy for children with special needs using a new coding system. Although there were a few studies which tried to adjust this analytic method for the therapy field, there haven't been any studies of individual music therapy for children with special needs.

FIAC was employed as the method of this study. A randomly selected part of a session was analyzed based on the procedure. The categories were reconsidered for the subject of this study. Observed materials were categorized and tabulated in a newly created, 17x17 matrix. The results showed that the client's special needs traits (e.g. self-stimulation, solitary play, jargon) and the therapist's non-verbal intervention were frequently observed with the ratio. Further accumulation of data pertaining to each special need category would supply therapists with a way of self reviewing the session.

Keywords：Education Research, Interaction Analysis, children with special needs, music, music therapy

Introduction

It is necessary to document what is going on in music therapy for analysing clients' amelioration in music therapy. It is very common for therapists to evaluate "clients' behaviour" for grasping the change. The object for evaluation and analysis in therapy is usually client. Therapist-Client Interaction, therapist behavioural tendency and the effectiveness of the therapy have not been focused.

There are various kinds of interaction between teachers (class givers) and pupils (class takers) in the education field, as well as interaction between therapists (therapy givers) and clients (therapy takers) in therapy field. In education, systematic observation that focuses on and studies "classroom teaching activities" has been developed. Specifically, teachers and classes themselves are focused on as observation objects.

Classroom analysis which focuses on interactive communication began in the 1960s. The system of coding conversations and behaviour in classrooms was developed to examine the correlation between teachers' behaviour and learning effectiveness. One of the researchers who proposed a concrete method is Ned Flanders. His method is called Flanders' Interaction Analysis Categories (FIAC), and has been broadly diffused in this study field. The method enabled the tendency of the class, as the observational target, to be numerically investigated based on teachers' and students' behaviour.

Such methodology in education might indicate that additional observation analyses would be useful in therapy as well. Shifting the direction of observational target object from clients to therapists should help to objectively realize the interaction and the tendency in therapy.

Purpose

The purpose of this study is to show how FIAC was applied to people with special needs and to create an original coding system and specific FIAC for children with special needs who are taking music therapy, which has not been carried out previously.

Basically, the FIAC system has been used in normal classroom education. It has not been common to apply FIAC to children with special needs because the categories were not specified for them. As far as music therapy is concerned, there was one trial which employed FIAC to group music therapy for elderly people with dementia (Yoshizu, 1994). However, it has not been applied to children with special needs.

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This study aims to suggest the interaction analysis for 'children' with 'special needs' in 'individual music therapy' based on FIAC.

Flanders'Interaction Analysis Categories

Flanders' Interaction Analysis Categories, FIAC, was developed by Ned Flanders out of Social psychology. It is an observational tool used to classify the verbal behaviour of the interaction between teacher and students in the classroom.

The verbal behaviour which is found in the classroom was categorised. There are two main categories: teacher talk and students' talk. A third category covers other verbal behaviour such as silence or confusion. The original Flanders Interaction Analysis Categories system consists of ten categories in total. There are seven categories used when the teacher is talking (Teacher talk) and two when the pupil is talking (Pupil talk) and tenth category is that of silence or confusion.

Table 1. shows the original categories of FIAC.

		Category number	Activity
Teacher talk	Indirect influence Response	1	**Accepts feeling**: Accepts and Clarifies an attitude or the feeling tone of a pupil in a non-threatening manner. Feeling may be positive or negative. Predicting and recalling feelings are included.
		2	**Praises or encourages**: Praises or encourages pupil action or behaviour. Jokes that release tension, but not at the expense of another individual; nodding head, or saying "Um hum?" or "go on" and included.
		3	**Accepts or uses ideas of pupils**: Clarifying or building or developing ideas suggested by a pupil. Teacher extensions of pupil ideas are included but as the teacher brings more of his own ideas into play, shift to category five.
		4	**Asks questions**: Asking question about content to procedure, based on teacher ideas, with the intent that a pupil will answer.
	Direct influence Initiation	5	**Lecturing**: Giving facts or opinions about content or procedures; expressing his own ideas, giving his own explanation, or citing an authority other than a pupil.
		6	**Giving directions**: Directions, commands or orders to which a pupil is expected to comply.
		7	**Criticising or justifying authority**: Statements intended to change pupil behaviour from non-acceptable to acceptable pattern; bawling someone out; stating why the teacher is doing what he is during; extreme self-reliance.
Pupil talk	Response	8	**Pupil-talk response**: Talk by pupils in response to teacher. Teacher initiates the contact or solicits pupil statement or structures the situation. Freedom to express own ideas is limited.
	Initiation	9	**Pupil-talk Initiation**: Talk by pupils, which they initiate. Expressing own ideas; initiating a new topic; freedom to develop opinions and a line of thought, like asking thoughtful questions; going beyond the existing structure.
Silence		10	**Silence or confusion**: Pauses, short periods of confusion in which communication cannot be understood by the observer.

Table 1. Flanders' Interaction Analysis Categories (FIAC)

Procedure of Flanders' Interaction Analysis

Interaction is usually observed in a tape recording. For every three seconds, the observer writes down the category number of the interaction (Table 1) in sequence in a column. The information is plotted on a matrix. The method of recording the sequences of events consists of entering the sequences of numbers into a 10-row by 10-column matrix. The vertical axis of the matrix is for the former number of the sequence, and the horizontal is for the latter.

There are some ground rules for encoding observation in FIAC such as;

・When it is not certain in which of two or more categories a statement belongs, choose the category that is numerically farthest from the category 5. For e.g., if an observer is not sure whether it is 2 or 3 then choose 2. If in doubt between 5 and 7, choose 5.

・If more than one category occurs during the three seconds interval, then all category used in that interval are recorded. If no change occurs within three seconds, then repeat category number.

This is because of the complexity of the problems involved in categorization, thus consistency is important. Table 2 indicates the measures for analyzing patterns of interaction.

Type of ratio	Calculation
Teacher talk (%)	100/total tallies*∑(cat.1+2+3+4+5+6+7)
Pupil talk (%)	100/t t *∑(cat. 8+9)
Silence (%)	100/t t *∑(cat. 10)
Teacher response ratio	Cat.1+2+3*100/∑(cat.1+2+3+6+7)
Pupil initiation ratio	Cat. 9*100/∑(cat.8+9)
Indirect-Direct influence ratio	∑(cat.1+2+3+4)/∑(cat.5+6+7)

Table 2. tt=total tallies, cat.=category

Interpreting the matrix of FIAC

Flanders' original interpreting the Matrix after encoding, decoding and tabulating is as follows.

1) The proportion of teacher talk, pupil talk, and silence or confusion

The proportion of tallies in columns 1, 2, 3, 4, 5, 6 and 7; columns 8, 9 and column 10 to the total tallies indicates how much the teacher talks, the student talks and the time spent in silence or confusion.

2) The ratio between indirect influence and direct influence

The sum of column 1, 2, 3, 4, divided by the sum of columns 5, 6, 7 gives this ratio. The ratio indicates whether a teacher's behaviour is indirective (ratio=1 or more than 1) or directive.

3) The ratio between positive reinforcement and negative reinforcement

The sum of columns 1, 2, 3 is to be divided by the columns 6, 7.

4) Student's participation ratio

The sum of columns 8 and 9 is to be divided by total sum. The answer will reveal how much the students have participated in the learning process.

Preceding study

FIAC is an interactive sequential pattern analysis originally intended for normal classroom activities. However, Nakayama (1986) attempted to modify FIAC for classes with special needs students (mental retardation). The main differences between the original FIAC and NAKAYAMA's study can be seen in the "interaction analysis categories (Table 3)".

		Category number	Activity
Teacher talk	Indirect influence Response	1	Accepts feeling
		2	Praises or encourages
		3	Asks questions
	Direct influence	4	Lecturing
		5	Giving directions
		6	Criticising or justifying authority
Pupil talk	Initiation Response Initiation	7	Simple response
		8	Pupil-talk response
		9	Pupil-talk Initiation
Teacher behaviour		10	Modeling movement
		11	Facilitating movement
Pupil behaviour		12	Learning movement
		13	Other movements

Table 3. Nakayama's Interaction Analysis Categories

Nakayama added four categories as alternatives to Flanders' tenth category; Silence or Confusion. He reasoned that it is because verbal behavior-oriented observation like FIAC would be inadequate for students with mental retardation. Their ways of expressing themselves with verbal communication might be limited, thus precise observation of non-verbal communication is needed for them. The research concluded as follows:

1) Such interaction categories as learning movement, explanation, modeling movement, simple response, giving directions, asking questions and facilitating movement were found frequently.

2) There was a high ratio of teacher's words compared to pupil's words indicating a teacher-centered teaching process such as the so-called explanation-question-simple response teaching pattern led by the teacher.

3) It was also found that the pupil's learning activities were prompted not by words but by movements in a question-response manner although the teacher always combined words with modeling movements. This tendency was more conspicuous with the seriousness of the intellectual handicap of the pupil.

In order to apply FIAC to music therapy, Yoshizu converted the role in the category from "teacher-pupil" to "therapist-client". She newly added two categories about music activity, namely clients' singing and therapist's piano playing (Table 4).

		Category number	Activity
Therapist talk	Response	1	Accepts feeling
		2	Praises or encourages
		3	Accepts or expands ideas of clients
		4	Asks questions: with the intent that a pupil will answer
	Convey	5	Lecturing
		6	Giving directions
		7	Criticising or justifying authority
Client talk	Response	8	Client-talk response
		9	Client-talk Initiation
Music activity		10	Clients' music activity
		11	Therapists' music activity
Conversation		12	Conversation/chatting simultaneously occurred in 2 places or more
Silence		13	Silence or confusion

Table 4. Yoshizu's Interaction Analysis Categories

The subject of this study is senior people with dementia (n=about 30, opened group, age: 60's-80's).
According to Yoshizu's tabulation, her targeted music therapy session was analysed as follow;
Therapist talk (total) 26.8%, Client talk (total) 18.1%, Music activity (total) 48.7%, Conversation 3.6%, Silence 0.1%
The total of two categories of music activity, which Yoshizu originally focused and added in FIAC, was 48.7%. It indicated that the session was music oriented. Through this analysis, she could objectively know the tendency of her own therapy.
FIAC is initially proposed by Ned Flanders in 1960's for education study and has been a basic methodology for this field. In 2000's, several researchers reviewed Flanders theory again (Gay, L. R., 2000, Newman, M., 2001, Hafix, M. M et al., 2008, Niki, F. R., 2011, Jasraj, Kaur., 2013, Veronica, O. A., 2015). Nakayama' study shows that FIAC is not only for mainstream school setting but also school for special needs. Furthermore, Yoshizu applied FIAC in "group music therapy" for "senior people with dementia" by new categories. Although FIAC was developed in therapy field as well as education field, there is no study made use in "individual music therapy" for "child with special needs". Therefore, this is the first study to analyse therapist-client interactive sequential patterns in individual setting based on education research-FIAC.

Category for children with special needs, individual setting

The categories are newly made for individual music therapy and for children. Compared to original FIAC categories, music categories are added because the target object for interaction analysis is music therapy.
3 categories are deducted from the original FIAC. Although Yoshizu used two music categories, the author divided the music categories into 8 (partly 10) categories because of the traits of autistic spectrum disorder.

		Category number	Activity
Therapist talk (Verbal)	Response	1	Accepts feeling
		2	Praises or encourages
		3	Asks questions: with the intent that a pupil will answer.
	Convey	4	Giving directions
Client talk	Response	5	Client-talk response
		6	Client-talk Initiation
		7	Client-talk jargon with Therapist's music or talk
		8	Client-talk jargon without Therapist's music or talk
Music activity (Non Verbal)	Non response	9	Client-self stimulative play with Therapist's music
		10	Client-self stimulative play without Therapist's music
		11	Client-solitary play with Therapist's music
		12	Client-solitary play without Therapist's music
		13	Client-musically interactive play
		14	Therapist-responsive music play to client behaviour
		15	Therapist-music
		16	Playing together
Silence		17	Silence or confusion

Table 5. Interaction Analysis Categories for individual music therapy for children with special needs (Matsuyama)

Materials & Methods

Subject & Structure of Therapy:

Individual music therapy, 45 minutes for each session.
Frequency of therapy: once a week, the client was given the explanation about break/holiday in advance.
Place: music therapy room in a development centre
Starting/Ending time, consistently same
Referral: the client was referred to a-three-time mother-child assessment session of music therapy in a development centre because of his difficulty in communication, language delay, developmental delay pointed by public health care centre. In the result of medical team conference, it was decided that the client started individual music therapy at the age of 4Y2M.
Diagnosis: Autism Spectrum Disorder
Instruments: piano, guitar, wind bar chimes, wind chimes, bamboo chimes, xylophone, metallophone, drums, tambours, tambourines, maracas, sleigh bells, bongos and other small instruments.

Procedure

A random part of a session was chosen for the analysis. The session resulted in a verbatim record, which was segmented in 3 second intervals and categorized by Table 5. The categorized numbers were tabulated in a 17 by 17 matrix, tallying up one pair at a time based on FIAC procedure. The observation for reliability was investigated by 2 other observers in separate rooms. Table 6 is an extract from the analysis and shows the decoding process.

time	therapist	client	category	the pair
0sec	Do you want to play?	listening	3	---
3	preparing	silence	17	3-17
6	preparing	silence	17	17-17
9	preparing	silence	17	17-17
12	playing the piano	solitary piano play	11	17-11
15	playing the piano	solitary piano play	11	11-11
18	We'll see you next week.	silence	4	11-4
21	playing the piano	listening	15	4-15
24	playing the piano	listening	15	15-15
27	playing the piano	listening	15	15-15
30	playing the piano	listening	15	15-15

Table 6. An example of the decoding process

Results

Table 7 shows the results of the tally and the ratio. From the sequence point of view, the pair 14-14 means the continuity of the therapist's responsive music play to client's behaviour. The pair 15-15 means the sequence of the therapist's play of music. Therapist and client continue to play together in the pair 16-16. The sums of tallies of these pairs are 41, 53 and 60, which indicate that this session relied on music activity.
The proportion of tallies in columns 1, 2, 3 and 4; columns 5, 6, 7, 8 and columns 17 to the total tallies indicates how much the therapist talks, the client talks and silence or confusion (Verbal-1～8, Non verbal-9～17).
The client behaves in a jargon/self stimurative way in the sequences 8-8, 10-10.
The pair 15-7 indicates that the client talks in a jargon manner while therapist is playing music, which means the client's difficulty in communicating with both music and therapist.

Discussion

The proportion of tallies in columns 7, 8, 9, 10, 11 and 12 to the total tallies indicates the traits of autistic spectrum disorder. Thus music therapy would be analysed for diagnostic assessment by using FIAC in individual music therapy for children with special needs. This FIAC would be adjustable for cerebral palsy, mental retardation and other handicaps by changing some categories. Accumulation of case studies under the same circumstances and statistical analysis are needed for generalization.
FIAC interaction analysis is an analytical observation scheme that offers an objective way of recording what a teacher does while teaching. This helps to record and evaluate the effectiveness of therapy and the tendency of the therapist. It gives the ratio of music, non-verbal aspects of the session and verbal direction.
It uses a system of categories to encode and quantify what is going on in the space (classroom/ therapy room). The purpose of developing the observational system is for therapists to be trained to use it to analyze their therapy; for planning, and studying the activities offered in order to create more effective therapy.
A different matrix can be created based on specific clients (in accordance with age, level, sex, subject-matter, handicap and so on).
The analysis would serve as feedback for therapists

→2nd figure of the pair

→1st figure of the pair	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	total	%
1																		0	0
2		1			1	1												3	1.23
3		1			1												1	3	1.23
4				3		1									4			8	3.29
5					1											1		2	0.82
6		1	1															2	0.82
7															6		2	8	3.29
8								8						1				9	3.7
9																		0	0
10										10				3			2	15	6.17
11				1			1				3							5	2.06
12				1														1	0.41
13																		0	0
14										5				41	2	1		49	20.2
15				3			5				1	1		2	53			65	26.7
16			1													60		61	25.1
17							2			1	1				1		7	12	4.94
total	0	3	2	8	3	2	8	8	0	16	5	1	0	47	66	62	12	243	
%	0	1.23	0.82	3.29	1.23	0.82	3.29	3.29	0	6.58	2.06	0.41	0	19.3	27.2	25.5	4.94		100
	Th. verbal				Cl. verbal				Non verbal										
							Non response												
							Aut. S. D. traits												

Table 7.

and enable them to analyze their manner and actual behaviour during the therapy. This system could be used with supervision to facilitate therapists' self-reviews and training.

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